

What is claimed is:

1. A particle beam irradiation system, comprising:
a charged particle beam generation apparatus; and
an irradiation apparatus for exposing an
irradiation target to a charged particle beam emitted from
the charged particle beam generation apparatus;

wherein said irradiation apparatus includes a
scattering device for increasing the size of said charged
particle beam and a Bragg peak spreading device through
which said charged particle beam passes; and

wherein at least one of said scattering device and
said Bragg peak spreading device is installed in said
irradiation apparatus in such a manner as to be movable in
a propagation direction of said charged particle beam.

2. The particle beam irradiation system according
to claim 1, further comprising a controller for placing at
least one of said scattering device and said Bragg peak
spreading device at a position that is in the propagation
direction of said charged particle beam and that is
determined in accordance with therapy plan information.

3. A particle beam irradiation system, comprising:
a charged particle beam generation apparatus; and
an irradiation apparatus for exposing an
irradiation target to a charged particle beam emitted from
the charged particle beam generation apparatus;

wherein said irradiation apparatus includes a scattering device for increasing the size of said charged particle beam, a range adjustment device for varying the range of said charged particle beam, and a Bragg peak spreading device through which said charged particle beam passes; and

wherein at least one of said scattering device, said range adjustment device, and said Bragg peak spreading device is installed in said irradiation apparatus in such a manner as to be movable in a propagation direction of said charged particle beam.

4. The particle beam irradiation system according to claim 3, wherein said scattering device and said range adjustment device are combined together.

5. The particle beam irradiation system according to claim 3, further comprising a drive device for moving said scattering device in said propagation direction and a drive controller for controlling said drive device and controlling an amount of movement of said scattering device.

6. The particle beam irradiation system according to claim 3, further comprising a drive device for moving said range adjustment device in said propagation direction and a drive controller for controlling said drive device and controlling an amount of movement of said range adjustment device.

7. The particle beam irradiation system according to claim 3, further comprising a drive device for moving

said Bragg peak spreading device in said propagation direction and a drive controller for controlling said drive device and controlling an amount of movement of said Bragg peak spreading device.

8. The particle beam irradiation system according to claim 4, further comprising a drive device for moving a combination of said scattering device and said range adjustment device in said propagation direction and a drive controller for controlling said drive device and controlling an amount of movement of said combination of the scattering device and the range adjustment device.

9. A particle beam irradiation system, comprising:
a charged particle beam generation apparatus; and
an irradiation apparatus for irradiating an irradiation target with a charged particle beam emitted from the charged particle beam generation apparatus;

wherein said irradiation apparatus includes a beam scanner for scanning said charged particle beam, a scattering device for increasing the size of said charged particle beam, and a Bragg peak spreading device through which said charged particle beam passes; and

wherein at least one of said scattering device and said Bragg peak spreading device is installed in said irradiation apparatus in such a manner as to be movable in a propagation direction of said charged particle beam.

10. The particle beam irradiation system according to claim 9, further comprising a controller for placing at

least one of said scattering device and said Bragg peak spreading device at a position that is in the propagation direction of said charged particle beam and that is determined in accordance with therapy plan information.

11. A particle beam irradiation system, comprising:
a charged particle beam generation apparatus; and
an irradiation apparatus for exposing an
irradiation target to a charged particle beam emitted from
the charged particle beam generation apparatus;

wherein said irradiation apparatus includes a beam scanner for scanning said charged particle beam, a scattering device for increasing the size of said charged particle beam, a range adjustment device for varying the range of said charged particle beam, and a Bragg peak spreading device through which said charged particle beam passes; and

wherein at least one of said scattering device, said range adjustment device, and said Bragg peak spreading device is installed in said irradiation apparatus in such a manner that the device is movable in the propagation direction of said charged particle beam.

12. The particle beam irradiation system according to claim 11, wherein said scattering device and said range adjustment device are combined together.

13. The particle beam irradiation system according to claim 11, further comprising a beam scan controller for controlling said beam scanner and controlling the scan of

said charged particle beam to which said irradiation target is exposed.

14. The particle beam irradiation system according to claim 13, wherein said beam scan controller controls said beam scanner so as to scan said charged particle beam in a scanning pattern for a region within said irradiation target.

15. The particle beam irradiation system according to claim 11, wherein a combination of said scattering device and said range adjustment device is installed in said irradiation apparatus in such a manner that the combination is movable in said propagation direction.

16. The particle beam therapy system according to claim 12, comprising a drive device for moving a combination of said scattering device and said range adjustment device in said propagation direction and a drive controller for controlling said drive device and controlling an amount of movement of said combination of the scattering device and the range adjustment device.

17. The particle beam therapy system according to claim 11, wherein a combination of said scattering device and said range adjustment device is positioned upstream of said beam scanner in said propagation direction.

18. The particle beam therapy system according to claim 11, wherein a combination of said scattering device and said range adjustment device is positioned downstream of said beam scanner in said propagation direction.

19. The particle beam therapy system according to claim 11, wherein said Bragg peak spreading device is positioned upstream of said beam scanner in said propagation direction.

20. A particle beam irradiation system, comprising:
a charged particle beam generation apparatus; and
an irradiation apparatus for exposing an irradiation target to a charged particle beam emitted from the charged particle beam generation apparatus,

wherein said irradiation apparatus includes a first scattering device for increasing the size of said charged particle beam, a second scattering device through which said charged particle beam passing through said first scattering device passes, and a Bragg peak spreading device through which said charged particle beam passes; and

wherein at least one of said scattering devices and said Bragg peak spreading device is installed in said irradiation apparatus in such a manner as to be movable in a propagation direction of said charged particle beam.

21. The particle beam irradiation system according to claim 20, further comprising a controller for placing at least one of said scattering devices and said Bragg peak spreading device at a position that is in the propagation direction of said charged particle beam and that is determined in accordance with therapy plan information.

22. A particle beam irradiation system, comprising:
a charged particle beam generation apparatus; and

an irradiation apparatus for exposing an irradiation target to a charged particle beam emitted from the charged particle beam generation apparatus;

wherein said irradiation apparatus includes a first scattering device for increasing the size of said charged particle beam, a second scattering device through which said charged particle beam passing through said first scattering device passes, a range adjustment device for varying the range of said charged particle beam, and a Bragg peak spreading device through which said charged particle beam passes; and

wherein at least one of said scattering devices, said range adjustment device, and said Bragg peak spreading device is installed in said irradiation apparatus in such a manner as to be movable in a propagation direction of said charged particle beam.

23. The particle beam irradiation system according to claim 22, wherein said first scattering device and said range adjustment device are combined together and the resulting combination of said first scattering device and said range adjustment device is positioned upstream of said second scattering device in said propagation direction.

24. The particle beam irradiation system according to claim 23, wherein a combination of said scattering device and said range adjustment device is installed in said irradiation apparatus in such a manner as to be movable in said propagation direction.

25. A method of adjusting an irradiation apparatus, which includes a scattering device for increasing the size of a charged particle beam emitted from a charged particle beam generation apparatus and a Bragg peak spreading device through which said charged particle beam passes, and which exposes an irradiation target to said charged particle beam, the method comprising the step of:

moving at least one of said scattering device and said Bragg peak spreading device in a propagation direction of said charged particle beam.

26. A method of adjusting an irradiation apparatus, which includes a scattering device for increasing the size of a charged particle beam emitted from a charged particle beam generation apparatus, a range adjustment device for varying the range of said charged particle beam, and a Bragg peak spreading device through which said charged particle beam passes, and which exposes an irradiation target to said charged particle beam, the method comprising the step of:

moving at least one of said scattering device, said range adjustment device, and said Bragg peak spreading device in a propagation direction of said charged particle beam.

27. The method according to claim 26, wherein said scattering device is allowed to move in said propagation direction in accordance with the irradiation target size in a direction perpendicular to said propagation direction.

28. The method according to claim 26, wherein said scattering device is allowed to move in said propagation direction in accordance with the thickness of a passage of said charged particle beam in said scattering device.

29. The method according to claim 26, wherein said range adjustment device is allowed to move in said propagation direction in accordance with the thickness of a passage of said charged particle beam in said range adjustment device.

30. The method according to claim 26, wherein said range adjustment device is allowed to move in said propagation direction in accordance with the range of said charged particle beam that is adjusted by said range adjustment device.

31. The method according to claim 26, wherein a combination of said scattering device and said range adjustment device is allowed to move in said propagation direction in accordance with the thickness of a passage of said charged particle beam in said scattering device and the thickness of a passage of said charged particle beam in said range adjustment device.

32. A method of exposing an irradiation target to a charged particle beam emitted from a charged particle beam generation apparatus using an irradiation apparatus which includes a scattering device for increasing the size of said charged particle beam and a Bragg peak spreading

device through which said charged particle beam passes, the method comprising the steps of:

moving at least one of said scattering device and said Bragg peak spreading device in the propagation direction of said charged particle beam; and

exposing said irradiation target to said charged particle beam which has passed through said scattering device, said range adjustment device, and said Bragg peak spreading device.

33. A method of exposing an irradiation target to a charged particle beam emitted from a charged particle beam generation apparatus using an irradiation apparatus which includes a scattering device for increasing the size of said charged particle beam, a range adjustment device for varying the range of said charged particle beam, and a Bragg peak spreading device through which said charged particle beam passes, the method comprising the steps of:

moving at least one of said scattering device, said range adjustment device, and said Bragg peak spreading device in the propagation direction of said charged particle beam; and

exposing said irradiation target to said charged particle beam which has passed through said scattering device, said range adjustment device, and said Bragg peak spreading device.